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Research Article

STUDY ON TREATMENT MODALITIES FOR TEMPOROMANDIBULAR JOINT PAIN AND DYSFUNCTION

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ABSTRACT

Aim: To investigate the efficacy of two treatment options (splint therapy, and physical therapy) in patients suffering from temporomandibular joint pain and clicking.
Materials and Methods: In this study, 40 patients were included suffering from temporomandibular joint disorders randomly divided into two groups. 20 patients were given TENS therapy (group I) and 20 patients given splint therapy (group II). In all the two groups, subjective and objective assessments were evaluated at the time of diagnosis, after the first week of initiation of therapy and every week for three months of follow up.
Results: There was gradual reduction seen in VAS scores, muscle tenderness, TMJ clicking and significant improvement in mouth opening in Group II therapy during the follow-up period as compared to Group I therapy.
Conclusion: The conventional soft occlusal splint therapy is a much safer and effective mode of a conservative line of therapy in comparison to TENS therapy in patients with TMJ pain and dysfunction.

INTRODUCTION

A temporomandibular disorder is most common chronic orofacial pain conditions. Temporomandibular Joint (TMJ) is known as ginglymoarthrodial joint, referring to its (ginglymo- and arthrodial), due to its dual compartment structure and function[1]. TMD etiology is little understood, but it is associated with several factors including emotional stress, trauma, malocclusion and parafunctional habits (clenching or bruxing).[2] It refer to cluster of disorders which may characterized by: pain in preauricular area, temporomandibular joint or in muscles of mastication, limitations or deviation in mandibular range of motion, and noises in TMJ during mandibular function.[3] Consequently, there are many different therapies like conservative and irreversible, reversible, including surgery and repositioning of the mandible, patients with TMJ pain and dysfunction.[4] Therefore, the purpose of this study is to investigate the efficacy of two treatment options (splint therapy and physical therapy) in patients suffering from temporomandibular joint pain and dysfunction.

Selection of patients

The Patients were selected for this study, among the patients visiting to the Department of oral medicine and radiology, SPPGIDMS, Lucknow, for the treatment for TMJ pain and dysfunction. 40 patients were selected after thorough examination that fulfilled the requirements and are willing to participate in the study.

Inclusion Criteria

- Chief complaint of acute pain (duration <3 months) in the joint on at least one side
- Presence of reciprocal joint clicking during jaw opening and closing that was eliminated on protrusive opening.[5]

Exclusion Criteria

Presence of systemic diseases (i.e. rheumatic diseases), history of recent trauma, wearing of full dentures, and therapeutic co-interventions during treatment.

All aspects of the study were approved by the Ethical Committee of the institution.

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METHODOLOGY

Patients were made to sit comfortably on a dental chair and all the examinations were carried out wearing sterile hand gloves and mouth mask with patient seated. Recording of demographic data, TMD history, general history, and physical examinations were carried out in a systematic manner at the baseline. All the data were entered in the proforma and a copy of it is enclosed. Each participant underwent a standardized clinical examination.

The study comprised of total 40 patients which were randomly divided into 2 groups i.e. TENS and Splint groups with 20 patients in each groups, out of which 21 were females (51.66%) and 19 were male (48.33%). The total mean age of male and female was 28 years (Splint=28.1, TENS=27.3).

Group assignment

The selected patients will be divided randomly into two treatment groups. 20 patients will be given TENS therapy (group I) and 20 patients will received splint therapy (group II). In all the two groups, subjective and objective assessments were evaluated at the time of diagnosis, after the first week of initiation of therapy and every week for three months of follow up.

Group I - will be given Transcutaneous Electrical Nerve Stimulation (TENS) therapy for a period of two weeks daily for 20 minutes at variable intensity.

Group II - will be treated with soft occlusal splint therapy for a period of three months (For every 1-2 week period). Patients will be instructed to wear the splint at night to take care of parafunctional habits if present.

Procedure of TENS

After briefly explaining the procedure to the patient, obtain the consent for treatment. Determination of electrode pad placement is then made, depending on the treatment to be performed. The site of pad placement is gently swabbed with isopropyl alcohol or alcohol wipes and dried to remove any skin oils or substances that may interfere with current flow. In males, facial hair should be shaved. The pad is then placed with the projection for lead attachment angled towards the inferior. The connector is then attached and locked into the position. The dentist then stimulates the area with appropriate stimulation mode(s) using required waveform parameters.

The dentist should make adjustments while discussing with the patient the sensation being experienced. Muscular fasciculation is a sign of reaching the minimal therapeutic level. After reaching this level, the operator can slowly increase the amplitude over a 20 seconds period to a maximum tolerable level to “dial out” any discomfort. Rapid increase in amplitude knob settings will not cause any tissue damage, but can cause acute discomfort. Maximum benefit is obtained after 25-30minutes of treatment. Prolonged treatment should be avoided, as it initiates a dull ache, which gradually increases in intensity.

After treatment is completed, the control knobs (amplitude and frequency knobs) are turned off completely, electrode leads are detached and the pads are removed from the face. The pads are then washed with water and mild soap gently and dried before replacing into the kit

Criteria for the muscle relaxation appliance

The following eight criteria must be achieved before the patient is given the muscle relaxation appliance:

1. It must accurately fit the maxillary teeth, with total stability and retention when contacting the mandibular teeth and when checked by digital palpation.
2. In CR all posterior mandibular buccal cusps must contact on flat surfaces with even force.
3. During protrusive movement the mandibular canines must contact the appliance with even force. The mandibular incisors may also contact it but not with more force than the canines.
4. In any lateral movement only the mandibular canine should exhibit laterotrusive contact on the appliance.
5. The mandibular posterior teeth must contact the appliance only in the CR closure.
6. In the alert feeding position the posterior teeth must contact the appliance more prominently than the anterior teeth.
7. The occlusal surface of the appliance should be as flat as possible with no imprints for mandibular cusps.
8. The occlusal appliance is polished so it will not irritate any adjacent soft tissues.

Statistics

The VAS scores, number of tender muscles, maximum comfortable mouth opening between the groups were compared with the help of the student's t-test (paired and unpaired tests). $P < 0.05$ was considered to be significant. TMJ tenderness between the groups was compared using the Wilcoxon matched pairs test. The Kruskal Wallis ANOVA test was used for the comparison of TMJ pain and dysfunction between all the groups.

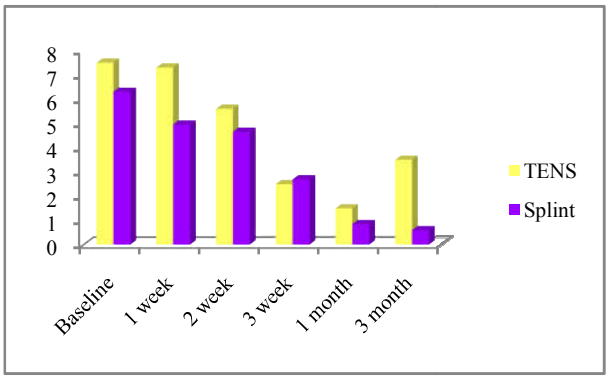
RESULTS

The comparison of different variables measured between the two groups at various time intervals. The VAS scores [Graph 1]; number of tender muscles [Graph 2] and TMJ clicking Graph 4] showed significant reduction in Group II (patients on occlusal splint therapy) compared to Group I (patients on TENS) during the three months of treatment follow-up.

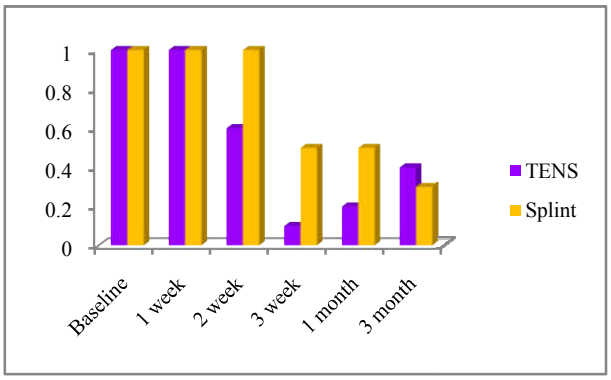
Group	Male	%	Female	%	Total
Splint group	10	50.00	10	50.00	20
Tens group	9	45.00	11	55.00	20
Total	19	48.33	21	51.67	40

Also, it can be noted here that a significant increase in mouth opening [Graph 3] was observed in Group II (patients on occlusal splint therapy) compared to Group I (patients on TENS). VAS scores for pain intensity [Graph 1] showed significant reduction in Group II immediately after seven days of therapy on the other hand, Group I showed no reduction in VAS scores immediately after seven days of therapy, but significant reduction was seen in the 3 rd month of treatment follow-up.

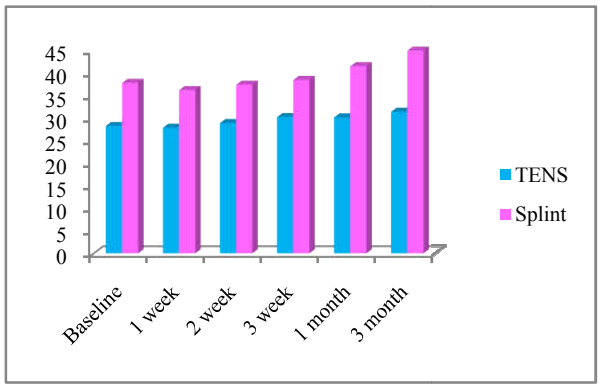
Though it was observed that the VAS score in the splint group was highly significant than other two groups, the difference between the groups was statistically highly significant.



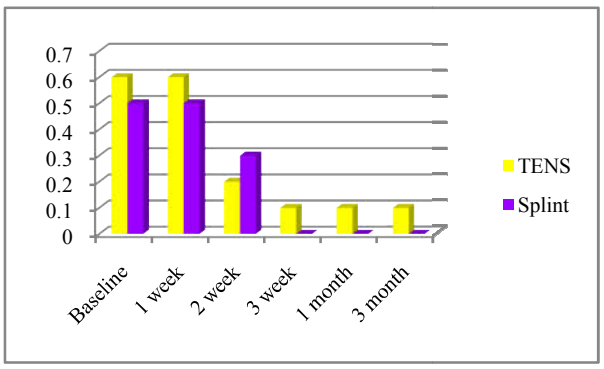
Graph 1 Pain Score



Graph 2 Muscle Score



Graph 3 Mouth Opening



Graph 4 TMJ Sound

DISCUSSION

Among all factors that have been studied as potential causes for TMD, behavioral and psychologic factors have received the most significant amounts of attention during the past few years. The scientific data suggest that behavioral and psychologic factors are important in some types of TMD, and those associated with muscle pain and dysfunction.[6] The treatment success for any disorder relies on two considerations: relieving of symptoms and treating the cause. The various treatment modalities for TMD have been tried and tested. Specific conservative treatment modality for TMD patients depends on patient presentation, clinicians' expertise, and elimination of possible etiologic factors. No single treatment modality has been proven to be better than any other for TMD, till date.[7] The present study evaluates the efficacy of two different treatment modality in the treatment of TMJ pain and dysfunction.

Both the groups showed significant reduction. In the existing study, there was significant pain reduction was observed in both the groups. At the end of the treatment, the pain reduction in GROUP II (90.48%) was slightly more than the GROUP I (53.25%). There was statistically significant difference is seen between the treatment groups, GROUP II THERAPY was slightly more effective and highly significant in relieving pain. *TENS* therapy is supposed to stimulate large, fast, myelinated, non-nociceptive neurons in the painful area, "closing the central gate" for those stimuli generated by pain specific fibers. This system, associated to the activation of an endogenous opioid system is supposed to be responsible for the analgesic effect of the TENS.[8]

Tsuga *et al*, [9] concluded that 87% of their patients had reduced TMJ pain; VAS reduction was seen in 50% of the patients. Harkins *et al*, [10] found that 74% of the patients with soft splints had reduction in facial myalgia. This is in agreement with the conclusions of Raphael *et al*, [11] who found that occlusal splints had decreased the VAS scores during a six-week follow-up study in patients with myofascial pain. In a prospective randomized study, Ismail *et al*. [12] demonstrated that, as well as splint therapy, physical therapy in combination with splint therapy was able to improve the VAS score and mandibular mobility of patients with arthrogenic TMD.

In both groups there was gradual but significant decrease in tenderness in all masticatory muscles and TMJs. The decrease in tenderness was slightly more in GROUP II than in GROUP I but the difference was statistically significant except for medial pterygoid muscle ($p<0.05$) at the follow-up visit. The reduction in muscle tenderness was significantly ($p < 0.05$) more in GROUP II than other group at the follow-up visit (70% reduction in GROUP I and 75% reduction is seen in the GROUP II).

Improvement can be explained by the fact that contacts on all of the teeth in occlusal splints with equal-intensity, with immediate disclusion and condylar guidance in all movements. This will relax the muscles and contribute to the reduction of abnormal muscle hyperactivity.[13] Kovaleski *et al*,[14] have shown significant reduction in TMJ, clicking, and muscle tenderness in response to soft occlusal splint therapy. There are only few studies on TENS therapy evaluating the efficacy on muscles tenderness.

In the present study at the follow-up, the increase in mean mouth opening was 14.55% for GROUP I and 18.89% for GROUP II and was statistically significant, although there was no significant difference between the groups. GROUP II THERAPY was slightly more effective and highly significant than GROUP I THERAPY in respect to maximum mouth

opening. Mehta N, *et al*.[15] observed there was increase in the interincisal distance in patients after TENS therapy, which is similar to our observation. Also, at the end of the follow-up, further reduction was seen in pain and tenderness was substantially more in GROUP II. Thus it appears that GROUP II THERAPY is useful in relaxing the muscles of mastication, in relieving pain, and thus, in breaking the pain-tension-pain cycle of TMD. Suvinen *et al*, [16] have also shown improvement in mouth opening after splint therapy.

In GROUP II, a few patients initially had some side effects such as dryness of mouth, occasional feeling of tightness of the appliance, and a feeling of queasiness and presence of foreign object, which gradually decreased within few days.[17]

The present study supports the use of conventional soft occlusal splints is the safe management of patients with TMJ pain and dysfunction.

CONCLUSION

The soft occlusal splint therapy is much effective and safer mode of a conservative line of therapy as comparison to TENS therapy in patients with TMJ pain and dysfunction. Furthermore, randomized blinded trials are necessary to validate the effectiveness of occlusal splint therapy in a larger study sample.

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